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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					
COST <i>(In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	188317	214445	270718	248170	241011	249822	252898	Continuing	Continuing
1155 Discrimination	18507	24382	28269	20304	22153	16436	16413	Continuing	Continuing
3153 Systems Arch and Engineering	16054	15653	22316	22406	23350	22590	22899	Continuing	Continuing
3156 System Lethality	0	0	7950	11915	11906	19819	19800	Continuing	Continuing
3352 Modelling and Simulation	46226	39585	27920	29379	26241	26512	26788	Continuing	Continuing
3353 JNTF	57211	55632	54741	52672	53942	58619	59961	Continuing	Continuing
3354 Targets*	1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing
3360 Test Resources*	41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing
4000 Operational Support	7378	10656	10832	11072	11024	11211	11180	Continuing	Continuing

* Funding for this project for FY01-05 contributed by PE 0603872C.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Technical Operations Programs are comprised of the centrally managed functional capabilities required to assure the execution of Theater Missile Defense (TMD), Family of Systems Engineering and Integration (FOS E&I), National Missile Defense (NMD), and Technology programs. Functional areas include BMD systems architecting and engineering analysis, test resources and facilities, modeling and simulation, and phenomenology data collection and analysis. These highly specialized BMD-specific investments provide the threat representative data and derived requirements, modeling capabilities, and test facilities necessary to meet the aggressive development, test, and deployment schedules of the TMD and NMD systems. These centrally managed programs are executed in a manner integrated with BMDO's mission areas.

The catalyst for reorganization of BMDO PEs, including the creation of this PE, was the fundamental shift in the Department's management approach for both the NMD program and TMD "Family of Systems". Technical Operations Programs were formerly distributed and managed within the NMD, TMD, and Technology mission areas. This required OSD and Congress to look across multiple PEs to understand the scope of these investments. Under a single PE, Technical Operations programs will be more

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identifiable and managed in a more streamlined manner. The Technical Operations Program Element establishment was accomplished and first reported in BMDO's FY99-03 Program Objective Memorandum submission.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

B. Program Change Summary	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (<u>FY 2000</u> PB)		184842	190650	160295
Congressional Adjustments			+25500	
Appropriated Value			216150	
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)			-1498	
b. OSD Reductions				
c. Emergency Supplemental				
d. Internal Reprogramming			-207	
Adjustments to Budget Years Since <u>FY 2000</u> PB		+3475		+110423
Current Budget Submit (<u>FY 2001</u> PB)		188317	214445	270718

Change Summary Explanation:

Significant changes in FY00, due to implementation of Congressional Direction including \$15M increase for Pacific Missile Range Facility to provide upgrade for radars, command & control engagement, and the optical tracking system (PMA 3360).

In addition to implementation of OSD PBD Direction, significant FY01 changes include:

- \$64M transferred from Joint (Other) TMD PE to Technical Operations to consolidate Test Resource (Project 3360) and Targets (Project 3354).
- \$32M increase to fund Ground Test Facilities and Ranges utilized by MDAPs Programs (Project 3360).
- \$8M to establish and consolidate overall BMDO Lethality Program activities (Project 3156)
- \$8M to perform alternative baseline architecture analyses and critical independent systems engineering studies (Project 3153).

C. Acquisition Strategy: See Individual R2 summaries.

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<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1155 Discrimination	18507	24382	28269	20304	22153	16436	16413	Continuing	Continuing

A. Mission Description and Budget Item Justification

To prepare for critical future defense needs, technical operations will support MDAP programs by conducting a balanced program of high leverage technologies that yield improved capabilities across a selected range of boost, midcourse, and terminal phase missile defense interceptors, advanced target sensors, and innovative science. The objectives of these investments are subsystems with improved performance or reduced costs for acquisition programs, and technical solution options to mitigate advanced and near-term National and Theater Ballistic Missile threats.

This program provides the U.S. with the data and predictive tools to generate high confidence target signatures for Ballistic Missile Defenses (BMD). This is a critical adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios. This program provides data collection sensors and instruments for use on live-fire missions and provides analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and Electro-Optical regimes. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection.

Data collection and exploitation of data is achieved by ground, air, and sea based assets for domestic and foreign tests. This includes collection by assets that are owned or operated by other agencies for use by BMDO.

Algorithms and Analysis work is divided into optical and radar regimes. Promising acquisition, discrimination, track, and aimpoint algorithms are coded and installed at the Lexington Discrimination System (LDS) for evaluation in a real-time operating mode using real and simulated data. Algorithms from acquisition programs are evaluated for effectiveness in a variety of targets and scenarios.

Models provide predictive signature codes ranging from high-fidelity single component models to integrated model architecture that combine several components into a composite modeling capability. Component models follow the subject discipline of hardbody targets, missile plumes, and backgrounds. Codes are validated and upgraded, as analysis of measured data becomes available and understood.

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FY 1999 Accomplishments:

- 8758 Algorithms and Analysis: Continued data analysis support for TMD systems in Dem/Val and EMD. Provided support for TMD radar/optical discrimination algorithms and architectures for advanced TMD threats and pen aids. Developed real-time algorithms for battlefield learning using neural networks, field data, and simulations on LDS. Developed algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
- 300 Advanced planning for the Adaptive Algorithms Technology program to support adaptive programs for discrimination.
- 4890 Models: Delivered validated signature models for high priority engagement scenarios. Continued participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and signature phenomenology.
- 2207 IR Data Collection Upgrade: Initiated Award of Advanced Technology and Measurement System contract and conducted System Requirements Review (SRR) and Integrated Baseline Review (IBR).
- 50 Cobra Ball Upgrade: Stand-up program.
- 200 Sensor and system trade studies.
- 1800 Continue program operations.
- 302 International: Acquired removable data storage unit for Multifunction Electronically Scanned Adaptive Radar (MESAR) trials.

Total 18507

FY 2000 Planned Program:

- 7015 Algorithms and Analysis: Provide data analysis support for TMD systems in Dev/Val and EMD. Provide support for NMD radar/optical discrimination algorithms and architectures for advanced NMD threats and pen aids. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
- 5131 Models: Continue development and validation of high fidelity signature and environment codes.
- 10967 IR Data Collection Upgrade: Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR).
- 377 Cobra Ball Upgrade: Initiate sensor subsystem design trade studies.
- 745 Government Project Personnel Support: Civilian Salaries for BMDO Executing Agent (EA)
- 147 International: Continue MESAR efforts and support of the Scientific Cooperative Research Exchange (SCORE) exchange with the UK.

Total 24382

FY 2001 Planned Program:

- 7188 Algorithms and Analysis: Data analysis support for TMD systems in Dev/Val and EMD. Provide support for NMD radar/optical discrimination algorithms and architectures for advanced NMD threats and pen aids. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
- 4929 Models: Continue development and validation of high fidelity signature and environment codes.
- 13675 IR Data Collection Upgrade: Delivery of sensor system, and cupola. Flight Readiness Review (FRR) integrated platform testing and first flight operations.

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<ul style="list-style-type: none"> • 248 Cobra Ball Upgrade: Sensor Procurement activities and design reviews. • 541 Government Project Personnel Support: Civilian Salaries for BMDO EA • 1688 International: Continuing ongoing efforts, including: MESAR radar measurements with UK; surface wave radar work with Canada; Down Under Early Warning Experiment (DUNDEE) missile detection and tracking experiments with Australia; TMD signature and phenomenology exchange with Israel; passive technology with the Czech Republic; and neural network and wide-field-of-view efforts with Hungary. <p>Total 28269</p>												
B. Other Program Funding Summary			<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Compl</u>	Total <u>Cost</u>
1155 NMD Program, PE 0603871C			0	400								400
C. Acquisition Strategy: This project funds its efforts through executing agents in the Air Force, Army, Navy and BMDO via existing contracts.												
D. Schedule Profile			<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>		
RDA Resources on Non-X band system plan			1Q	1Q								
ODA Model and simulation support			1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q						
Release SSGM 98			1Q									
Delivered SAMM 2.0			2Q									
SHARC code 4.1			2Q									
Support BMDO test flight programs				1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q					
IR Sensor SRR					1Q							
IR Sensor PDR					2Q							
IR Sensor CDR					4Q							
IR Sensor Integration and Test						1Q-3Q						
IR Sensor First Flight						4Q						
IR Sensor O&M							1Q-4Q					
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BMDO RDT&E COST ANALYSIS (R-3)

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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. IR Sensor Upgrade	C, CPFF	Aeromet, OK	2205	10679	1Q00	13675	1Q01	0	26559	
b. Cobra Ball Upgrade	C, TBD	Raytheon, TX	50	377	1Q00	248	1Q01	80000	80675	
			2000						2000	
Subtotal Product Development:			4255	11056		13923		80000	109234	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. OSC SW Maintenance	CPFF	TBE, Huntsville AL	547	400	1Q00	300	1Q01	Cont.	1247	
b. BES Development	Allot	SMDC, H'sville AL		961	1Q00	893	1Q01	Cont.	1854	
c. Bkgnds SW Dev	Allot	AFRL, MA	1020	1086	1Q00	1000	1Q01	Cont.	3106	
d. SSGM Software Dev	Allot	NRL, Wash DC	400	400		400	1Q01	Cont.	1200	
e. SSGM SW Dev	CPFF	PRA, Calif Other, VA	1504	1096		1161	1Q01	Cont.	3761	
f. Cont. Eng Supprt	C, CPFF	Other, VA	925	866	1Q00	883	1Q01	Cont.	2674	
Subtotal Support Costs:			4396	4809		4637			13842	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Mission Planning supt.	Other		503	278	1Q00	292	1Q01	0	1073	
b. MESAR Trials	MIPR	PEO-TAD, Wash	225	0		0		0	225	
Subtotal Test and Evaluation:			728	278		292			1298	

Remark:

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BMDO RDT&E COST ANALYSIS (R-3)

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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Plumes Analysis	Allotment	AFRL, CA	1019	1086	1Q00	1001	1Q01	Cont.	3106	
b. Radar Analy / Supprt	MIPR	MIT/LL Lex, MA	4872	3769	1Q00	3350	1Q01	Cont.	11991	
c. Optical analy (ODA)	C, CPFF	NRC, H'sville AL	2761	2492	1Q00	2837	1Q01	Cont.	8090	
d. Prog Man Pers	Allotment	SMDC, H'sville AL		745	1Q00	541	1Q01	Cont.	1286	
e. Other Intl prgms	Other		476	147	1Q00	1688	1Q01	Cont.	2311	
Subtotal Management Services:			9128	8239		9417			26784	

Remark:

Project Total Cost:			18507	24382		28269		80000	151158	
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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3153	
COST (In Thousands)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3153 Systems Arch and Engineering	16054	15653	22316	22406	23350	22590	22899	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This project supports the Office of the Chief Architect/System Engineering to address Joint Systems Architecture/Engineering (JSAE) issues in a coordinated and synergistic manner across all National Missile Defense (NMD) and Theater Air and Missile Defense (TAMD) efforts. It provides the technical foundation for program acquisition decisions at the architectural level. This office reports directly and independently to the BMDO Director, serving as the Organization's senior technical advisor to the BMDAE for JSAE, integration and support; providing the necessary mission-area oversight of critical BMDO technical issues.</p> <p>The Office of the Chief Architect/System Engineering provides the technical assessment of the expected effectiveness of major programs under development and requirements for supporting technology and are responsible to:</p> <ul style="list-style-type: none"> • Develop BMD mission area requirements; • Conduct BMD System Engineering; • Direct analysis of future joint mission area architectures; • Direct system analysis capabilities; • Develop an integrated joint systems architecture engineering management framework; • Formulate and supervise systems architecture/engineering concepts to ensure BMD programs are feasible, survivable, testable, and easily upgradable; • Investigate test and evaluation (T&E) processes and strategies, providing input to various T&E forums, integrating T&E within the systems engineering process; • Oversee all aspects of the BMDO program impacting the formulation and execution of Battle Management Command, Control, and Communications (BM/C3) research, development, and acquisition to support national and theater missile defense. <p>Functional areas of policy determination, expertise, and execution include System Engineering and Architecture Analysis, Missile Defense Interoperability, Test and Evaluation, and System Planning.</p> <p>System Engineering and Architecture Analysis activities facilitate the overall BMDO system engineering corporate decision-making process. These efforts lead the implementation of Joint Systems Architecture Engineering within BMDO. This activity provides the technical interface for BMDO with the Office of the Secretary of Defense (OSD) technical engineering offices and develops JSAE implementation processes and policies. This activity conducts the requirement analysis, functional analysis and allocation, physical systems/architecture analysis and synthesis of new systems and architectures, and systems architecture analysis and control necessary for NMD, TAMD, and Technology mission areas.</p>									
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<p>Missile Defense Interoperability activities assure, through policy formulation and implementation, that DoD and BMD interoperability requirements support the services and coalition partners. Specific activities include: NATO BMC3 Analysis; US/GE planning and analysis; US/UK multi-sensor tracking and fusion; implementation of Joint Technical Architecture (JTA); BMC3 support related to allied capabilities and interfaces; data standardization activities; and development of DE/JTAMDO technical architectures.</p> <p>Systems-level Test and Evaluation is responsible for overarching BMDO T&E activities that provide integrated/centralized T&E program execution guidelines and resources. Specifically this includes development of T&E policy, performing specialized studies, T&E resource and infrastructure reviews, T&E documentation reviews, service and OSD T&E liaison, MDAP T&E program insight and tracking, OT&E integration with BMDO T&E (BOTEC) and participation in the Joint Test and Evaluation (JT&E) program.</p> <p>System Planning supports the BMD Master Planning process by providing the applied architectural engineering information needed to baseline currently defined systems and develop options for P3I upgrades and next generation missile defense systems. Emphasis is on analyses of post-2010 threats and excursions, identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative concepts, defining system needs for technology, and assisting in preparation of OSD required pre-milestone I documentation.</p> <p>The primary thrust of the work is to analytically show the need for and expected performance of different defense systems under development to address current and projected threats. The systems-level architecture/engineering analysis supports efforts to determine the expected operational performance and effectiveness of missile defense systems under development. Models and simulations are used to investigate architecture and system level capability and to resolve critical technical issues related to the development of specific elements of the architecture. Tradeoffs in alternative elements, specific designs, inventory and integration of systems are conducted to determine the most cost-effective approach for a particular missile defense mission. Analysis is performed on a continuing basis in order to determine the impact of changing threats, mission requirements, and technological advances. Analysis priorities are determined by the Integrated Analysis Leadership Group (IALG), a group sponsored by the Chief Architect/Engineer with representatives from across BMDO. The remaining core JSAE efforts focus on integrating ongoing efforts across the TAMD and NMD mission areas and developing and implementing policies designed to enhance system and cost performance. These efforts reduce system and architectural risks, improve system interoperability, focus technology planning and prioritization, and integrate T&E and M&S efforts.</p> <p>This project provides technical recommendations for missile defense acquisition and budget allocation decisions to the Director.</p>		
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<p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> 11577 Architecture/Engineering Analysis: Through the IALG, developed an overall analysis plan for the BMDO and oversaw the analysis process. Participated in engineering trade studies with the TAMD systems engineer. Performed commonality studies on the Upper Tier TMD systems. Continued systems analysis of architecture/system performance and related technical issues as directed by Congress, the Department of Defense, the BMDO Director, and the Chief Architect/Engineer. Directed the Joint Systems Engineering Team (JSET). Managed the systems technology implementation process and develop pre-planned program improvement requirements. 4477 Architecture/Engineering Core: Led BMDO JSAE efforts to develop strategies, policies, and processes. Provided BMDO system-level capability to address emerging system requirements and concerns in a synergistic manner across all NMD and TAMD development efforts and facilitate the translation of operational requirements to joint and combined interoperable systems. Led BMDO participation in the development and implementation of various BMDO, DoD, Allied, and other Government and commercial initiatives relating to BMDO NMD/TMD BM/C3 development. Conducted Joint Technical Architecture (JTA) compliance engineering; held T&E Steering Group (TESG) and BMD Operation T&E Council (BOTEC) meetings; oversaw High Level Architecture (HLA) compliance and migration; and produced the BMDO Open Systems Assessment and the Test and Experiment Activities Summary (TEAS). <p>Total 16054</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> 9403 System Engineering and Architecture Analysis: Support analyses for Current Systems/Architectures, development of advanced/future systems/architecture requirements, and develop and maintain engineering threat documentation. Conduct functional and physical analysis and related allocation in support of current and advanced/future systems/architectures. Perform risk analysis and mitigation/control activities, trade-off analysis, and conduct program reviews in support of architecture analysis and control function. Support BMDO corporate technical decision processes. 3800 Missile Defense Interoperability: Formulate policy and implement DoD and BMD interoperability requirements in support of the services and coalition partners. Conduct BMC3 activities, to address NATO, US/GE, and US/UK customer interoperability scenarios and issues. NATO analysis will include joint experiment planning and upgrade of Extended Air Defense Test Bed. US and United Kingdom interoperability efforts concentrate on multi-sensor tracking and fusion. An interoperability study will be conducted during FY00. BMC3 interoperability activities address DoD's mandated implementation of the Joint Technical Architecture. BMC3 Support includes technical analysis of allies capabilities and interfaces to TAMD, tracking and maintaining an allies capability inventory, support of BICAR and DISA, quick reaction suspense/document reviews, analysis of CINC interoperability shortfalls, and interoperability analysis of Service Systems/JPN/JDN/JCTN. Data Standardization support includes development of TMD/NMD information exchange requirements, support of common data definitions required for NMD/TMD, analysis of standardization of interfaces to external systems, support to NMD data process and Missile Defense Data groups, review of Service BMC3 documents, MD Data Element Crosswalk input development, Metadata analysis, and technical review of data packages from JTAMDO and NMD. BMC3 interoperability efforts also develop joint TMD Technical Architectures. Technical Architectures and related analysis will be developed for 2003 and 2010 timeframes. 		
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<ul style="list-style-type: none"> 850 Test and Evaluation: This task conducts T&E activities required to support BMDO architecture and system engineering functions by ensuring T&E is used to reduce acquisition risk and provide early and continuing estimates of system performance. It insures test planning, testing and analysis of test results are integral parts of the systems engineering process to meet objectives. This includes reviewing SEMP's and other Systems Engineering (SE) documentation, to verify T&E programs and documentation (TEMP's) are traceable and support the SE requirements verification process. These T&E activities will also include assessing testability of current and future BMD architectures and MD Lethality Program test and experiment support. 1600 System Planning: Activities develop missile defense system concept alternatives, linked to the evolution of the currently defined BMD system, for inclusion in the BMD Master Planning process. Specific task activities include assistance in defense threat characterizations (post-2010), identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative defense concepts, system needs definition for advanced technology programs, leadership of Joint Technology Board process, and technical assistance in developing Pre Milestone I OSD required documentation. <p>Total 15653</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> 13566 System Engineering and Architecture Analysis: Support analyses for Current Systems/Architectures, development of advanced/future systems/architecture requirements, and develop and maintain engineering threat documentation. Conduct functional and physical analysis and related allocation in support of current and advanced/future systems/architectures. Perform risk analysis and mitigation/control activities, trade-off analysis, and conduct program reviews in support of architecture analysis and control function. Support BMDO corporate technical decision processes. 4300 Missile Defense Interoperability: Formulate policy and implement DoD and BMD interoperability requirements in support of the services and coalition partners. Conduct BMC3 activities, to address NATO, US/GE, and US/UK customer interoperability scenarios and issues. NATO analysis will include joint experiment planning and upgrade of Extended Air Defense Test Bed. US and United Kingdom interoperability efforts concentrates on multi-sensor tracking and fusion. BMC3 interoperability activities address DoD's mandated implementation of the Joint Technical Architecture. BMC3 Support includes technical analysis of allies capabilities and interfaces to TAMd, tracking and maintaining an allies capability inventory, support of BICAR and DISA, quick reaction suspense/document reviews, analysis of CINC interoperability shortfalls, and interoperability analysis of Service Systems/JPN/JDN/JCTN. Data Standardization support includes development of TMD/NMD information exchange requirements, support of common data definitions required for NMD/TMD, analysis of standardization of interfaces to external systems, support to NMD data process and Missile Defense Data groups, review of Service BMC3 documents, MD Data Element Crosswalk input development, Metadata analysis, and technical review of data packages from JTAMDO and NMD. BMC3 interoperability efforts also develop joint TMD Technical Architectures (DE/JTAMDO). Technical Architectures and related analysis will be developed for 2003 and 2010 timeframes. 1200 Test and Evaluation: Conduct BMDO level T&E functions to include BMD T&E policy development, T&E requirements special studies, MDAP program insight, and external T&E community coordination activities. BMDO T&E policy includes ensuring implementation of centralized/integrated T&E practices and resources. Special studies includes determining/investigating T&E needs and requirements and providing inputs to various T&E forums. Insight includes tracking of MDAP issues, T&E program documentation review and participation in T&E IPTs. 		
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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3153																																																																									
<ul style="list-style-type: none"> • 3250 System Planning: Activities develop missile defense system concept alternatives, linked to the evolution of the currently defined BMD system, for inclusion in the BMD Master Planning process. Specific task activities include assistance in defense threat characterizations (post-2010), identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative defense concepts, system needs definition for advanced technology programs, leadership of Joint Technology Board process, and technical assistance in developing Pre Milestone I OSD required documentation. <p>Total 22316</p>																																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">B. Other Program Funding Summary</th> <th style="text-align: center; padding: 5px;"><u>FY 1998</u></th> <th style="text-align: center; padding: 5px;"><u>FY 1999</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2000</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2001</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2002</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2003</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2004</u></th> <th style="text-align: center; padding: 5px;"><u>FY 2005</u></th> <th style="text-align: center; padding: 5px;">To <u>Compl</u></th> <th style="text-align: center; padding: 5px;">Total <u>Cost</u></th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">3352 Modeling and Simulation Core Capability PE 0603874C</td> <td></td> <td style="text-align: center;">45059</td> <td style="text-align: center;">39585</td> <td style="text-align: center;">27920</td> <td style="text-align: center;">29379</td> <td style="text-align: center;">26241</td> <td style="text-align: center;">26512</td> <td style="text-align: center;">26788</td> <td style="text-align: center;">Continuing</td> <td style="text-align: center;">Continuing</td> </tr> <tr> <td style="padding: 5px;">3354 Targets Development Core Capability PE 0603874C</td> <td></td> <td style="text-align: center;">1936</td> <td style="text-align: center;">2300</td> <td style="text-align: center;">49135</td> <td style="text-align: center;">36211</td> <td style="text-align: center;">38081</td> <td style="text-align: center;">40260</td> <td style="text-align: center;">40882</td> <td style="text-align: center;">Continuing</td> <td style="text-align: center;">Continuing</td> </tr> <tr> <td style="padding: 5px;">3360 Test Resources Core Capability PE 0603874C</td> <td></td> <td style="text-align: center;">41005</td> <td style="text-align: center;">66237</td> <td style="text-align: center;">69555</td> <td style="text-align: center;">64211</td> <td style="text-align: center;">54314</td> <td style="text-align: center;">54375</td> <td style="text-align: center;">54975</td> <td style="text-align: center;">Continuing</td> <td style="text-align: center;">Continuing</td> </tr> </tbody> </table>										B. Other Program Funding Summary	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Compl</u>	Total <u>Cost</u>	3352 Modeling and Simulation Core Capability PE 0603874C		45059	39585	27920	29379	26241	26512	26788	Continuing	Continuing	3354 Targets Development Core Capability PE 0603874C		1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing	3360 Test Resources Core Capability PE 0603874C		41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing																												
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<p>C. Acquisition Strategy: Systems analysis work in this project is contracted. For other JSAE efforts, expertise of Government, Federally Funded Research & Development Center (FFRDC), System Engineering and Integration Contractor (SEIC), and Scientific, Engineering and Technical Assistance (SETA) personnel are leveraged in the execution of project activities, using existing contracts to the maximum extent possible. Specifically, U.S. Army Space and Missile Defense Command (USASMDC) and USAF/Electronic Systems Center (ESC) Government and contractor personnel lead Information Architecture and development efforts; SETA and SEIC contracts provide the core of technical expertise for a variety of JSAE activities; and FFRDC contract vehicles provide state-of-the-art technical expertise in Software Engineering and related technical areas. Additional contractor services will be procured if needed to meet emerging program requirements.</p>																																																																																	
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<div style="display: flex; justify-content: space-between;"> Project 3153 Page 12 of 52 Pages Exhibit R-2A (PE 0603874C) </div>																																																																																	

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000	
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3153
Integrated Analysis Leadership Group (IALG)			Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
“Quick-Reaction” Analysis			Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
NATO BMC3 Analysis Final Report			4Q					
US/GE Analysis Final Report			4Q					
BMDO Annual Interoperability and Cap. Report			4Q					
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BMDO RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603874C BMD Technical Operations

PROJECT

3153

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

Project 3153

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BMDO RDT&E COST ANALYSIS (R-3)										DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3153		
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 1999</u> Cost	<u>FY 1999</u> Award Date	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.	CPAF	SPARTA		4540		5346		8215		TBD	18101	
b.	CPAF	CSC		4500		5260		6650		TBD	16410	
c.	CPFF	SRS		1200		0		0		TBD	1200	
d.	CPAF	Vanguard Research		1000		1105		3263		TBD	5368	
e.	Various	POET		4814		2942		4188		TBD	11944	
f.	Various	ISEG				1000					1000	
Subtotal Management Services:				16054		15653		22316			54023	
Remark:												
Project Total Cost:				16054		15653		22316			54023	
Remark:												

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3156	
<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3156 System Lethality	0	0	7950	11915	11906	19819	19800	Continuing	Continuing

A. Mission Description and Budget Item Justification

The BMDO Corporate Lethality Program focuses on the mission-kill definition of lethality. The project consists of four areas of interest: target response, agent/debris source term characterization, atmospheric transport and dispersion, and ground effects. To this end, the program executes a rigorous process of experimentation and analysis to support development of models themselves supporting the acquisition and operational deployment of ballistic missile defense (BMD) systems. A part of the System Engineering Directorate's Threat and Lethality efforts, the Corporate Lethality Program supports system engineering and operational analyses by utilizing the lethality community in several ways. These ways include performing sensitivity assessments of the current pool of lethality knowledge for BMD purposes, furthering corporate BMDO knowledge on the behavior of weapons of mass destruction (WMD) following intercept by a BMD system, supporting test and evaluation programs with lethality data assessments and uncertainty bounds, and executing future program budget decision requirements. The Corporate Lethality program will also support acquisition of the BMD major defense acquisition programs by providing top-level assessments of the system-level Test and Evaluation Master Plans, looking for completeness from a lethality perspective, and providing support to those test events capable of rendering lethality data products. In addition, the Corporate Lethality Program will work in collaboration with Allied governments to cooperatively enhance our understanding of the behavior of WMD in the appropriate flight regimes. Ultimately, the Corporate Lethality Program's efforts will help us better understand end-state deposition on the ground following a BMD system intercept.

Target Response – Provide the ability to understand and predict the dynamics of target impact response, for target structures and payloads, resulting from intercepts by hit-to-kill (HTK), HTK alternatives, and directed energy weapons. Provide the ability to assess the success of the intercept, and type of warhead intercepted.

Agent/Debris Source Term Characterization – Provide the capability to characterize and predict the formation of target debris and agent release, as source terms for transport and dispersion resulting from the intercept of a target by HTK, HTK alternatives, or directed energy weapons.

Transport and Dispersion – Provide the capability to characterize and predict the transport and dispersion of intercept debris and agent released following the intercept of a target by HTK, HTK alternatives, or directed energy weapons. Also, characterize the environmental effects on the released agent and impact.

Intercept Effects and Consequences – Provide data to bound the effects of the intercept on operational capabilities, defended assets, and identify potential collateral consequences.

Note: This project, beginning in FY01, consolidates both the corporate BMDO lethality studies currently located in multiple Program Elements and post-engagement lethality work conducted by the BMDO MDAPs.

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE February 2000																																																																																									
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FY 1999 Accomplishments: Total 0 Program starts in FY2001 FY 2000 Planned Program: Total 0 Program starts in FY2001 FY 2001 Planned Program: <ul style="list-style-type: none"> • 2450 Target Response: Light gas gun (LGG) tests at high velocity with computational support, hydrocode benchmarking for high-speed impacts (and continuing PLATE-like activities), and analysis for Parametric Endo_ExoLethality Simulation (PEELS) validation and accreditation. Define criteria for hydrocode predictions of damage to thin-walled canisters and bomblets, laser tests to simulate aerothermal effects on submunitions, and Red-Team effort to prevent/reduce aerothermal demise of canisters and bomblets. • 1490 Agent/Debris Source Term Characterization: Laboratory studies of high-strain-rate fluid expansion and breakup, measurements of agent EOS and stability against shock loading, and follow-on model development and computational support. • 3570 Atmospheric Transport and Dispersion: Extend data for fluid breakup in rapid air streams, measure agent physical and thermodynamic properties and computational support, chemistry studies of agent stability at high altitudes, T&D sensitivity analyses with HPAC and/or VLSTRACK, and follow-on model development and computational support. • 440 Ground Effects: Evaluate sensor requirements and capabilities to assess post-impact damage and warhead type, apply sensor technologies to ongoing tests, and develop and apply models for signature generation. Establish cooperative efforts between ground consequences community and provide necessary BMD-related source term information for incorporation to their predictive tools. Total 7950																																																																																																	
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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)										DATE February 2000	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3156	
3359	System Test and Evaluation, PE 0603872C		3966	10816							14782
Note: Funding reflects lethality efforts only.											

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BMDO RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603874C BMD Technical Operations

PROJECT

3156

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Lethality Analysis	Various	Multiple				7950			7950	7950
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:						7950			7950	7950

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

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BMDO RDT&E COST ANALYSIS (R-3)									DATE February 2000	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3156	
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										
Remark:										
Project Total Cost:						7950			7950	7950
Remark:										

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3352	
<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3352 Modelling and Simulation	46226	39585	27920	29379	26241	26512	26788	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project ensures timely availability of reliable, cooperative, and cost-effective BMDO and Service-provided Modeling Simulation, & Networks (MS&N) tools and capabilities responsive to BMDO requirements. This project provides for the program management, planning, coordination, and technical oversight of system level M&S for the Joint Theater Air and Missile Defense (JTAMD) and the National Missile Defense (NMD) Deployment Readiness Programs. This cost effective approach reduces the high cost of missile test programs and generates the information needed to make timely and informed operational, requirements, performance, design/cost/risk tradeoffs, mitigation and resource allocation decisions.

MS&N programs funded by this project include: Wargame 2000, M&S Support, M&S Acquisition Strategy/Investment Plan, Mission Oriented Information Technology Resources (ITR), the BMD Simulation Support Center (BMD SSC), and the infrastructure portion of the Advanced Research Center/Simulation Center (ARC/SC).

Wargame 2000 is being developed as a BMD simulation to run wargames and exercises at the JNTF for the next 10 years. The requirements are to: design the simulation using an object oriented paradigm, enable “plug and play” of TMD and NMD models, facilitate integrating (BMDO’s JNTF) internal and external elements into a flexible real-time simulation suite, incorporate more realistic C2 displays, enhance wargaming productivity and responsiveness, and provide for multi-level security.

The BMD SSC will store M&S tools which are joint, global and possess multi-level fidelity. The BMD SSC seamlessly links existing and planned simulations of C4I networks, platforms and weapon systems. This activity also includes the operation and maintenance of centralized M&S catalogs of databases that identify current and developing BMDO simulation tools. BMD SSC has been designated as the BMDO Node for models, simulations, and data on the Defense Modeling and Simulation (DMSO) Resource Repository (MSRR).

This project also provides acquisition and support services for the design, development, modernization, and control of BMDO Mission Oriented ITR. The objective for this program is to provide responsive ITR support and services via a flexible, responsive architecture to satisfy validated current and projected user ITR requirements. Specific tasks include processing of Mission Oriented ITR-related service requests, conducting the Mission Oriented ITR Working Group and supporting BMDO Chief Information Officer (CIO) initiatives such as the drafting and implementation of the mission oriented portions of the BMDO Strategic Information Management Plan and BMDO Five Year Information Resources Management Plan (FYIRMP). This project is also responsible for the identification and support of High Performance Computing requirements.

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M&S activities also funded by this project include: development, enhancement, and maintenance of the theater test beds and conduct of wargames that provide the analysis, integration, demonstration, and performance verification for TMD systems. It ensures joint usage of simulation tool resources and supports allied and friendly international participation and cooperation in wargaming exercises. This project focuses M&S support in four primary areas: assessments, development/modification, computer architectures/networks, and program management for BMDO and Service M&S programs.

Design and develop a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In a parallel effort, connect AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability will link the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the AEGIS Combat System Engineering Development Site (CSEDS) in Moorestown, NJ. The NGI/VPN technology will support high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications.

This project is conducted in accordance with DoDD 5000.59, DoD Modeling and Simulation (M&S) Management.

FY 1999 Accomplishments:

- 14724 Provided high performance computing resources at the ARC/SC which operates a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, the Theater High Altitude Area Defense System (THAAD) Test Bed, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground-Based Radar (GBR), ISTC, and NMD Joint Program Office. Major areas of support included maintenance, modification, and enhancement of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; technical base analysis; concept studies; and alternative trade-off analysis.
- 2860 Provided Army project personnel and support funding for the ARC/SC.
- 3270 Provided BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area included funding for Service M&S activities. Top priorities included: the BMDO M&S Strategic Plan; Wargame 2000; BMD SSC; Modeling and Simulation Working Group (MSWG) management; execution of MSWG action plans; and model assessments/evaluations.
- 780 Continued to support BMDO's Mission Oriented ITR. Priorities included: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations; implementation of new technology to support multimedia applications; and replacement of obsolete computational resources.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603874C BMD Technical Operations	3352
<ul style="list-style-type: none"> 12674 Provided JNTF Project funding to support continued development of Wargame 2000 and BMD SSC. The Wargame 2000 program continued to design and develop a “world-class” simulation tool for use in support of CinC wargames and exercises. Wargame 2000 tests operational concepts involving Theater Air and National Missile Defense. Funding supported an NMD Initial Operational Capability (IOC), Block 10 Demo, integration with BMC3, initial TMD capability development, and an NMD C2SIM 99 with Block 20. The BMD SSC continued to support TMD and NMD in the following areas: assisted in software development process improvement for M&S, developed processes for testing and improving models and algorithms; incorporated new web technologies into the BMD SSC, and updated the TMD, NMD and Building Block M&S catalogs/repositories. Provided on-line query capabilities using BMDO Core M&S and interconnected with Defense Modeling and Simulation Office (DMSO) Modeling and Simulation Resource Repository (MSRR) as an official DoD Node. 11918 Provided funding to the BMDO Data Centers Program to archive, manage, develop data products, distribute and provide remote access to all relevant BMD data. Specific priorities included: Advanced Missile Signature Center (AMSC) – provided NMD Family of Systems (FoS), Cruise Missile Defense, Boost Phase Interceptor, and Midcourse Space Experiment (MSX) programs data management support, and developed and implemented Virtual Data Center (VDC); Backgrounds Center of Expertise (BCoE) –interoperability and integration, program data management support; the BCoE also provided primary development effort for the VDC. Missile Defense Data Center (MDDC) – provided Theater Air and Missile Defense (TAMD) and NMD FoS, NMD Ground Based Interceptor (GBI), Ground Based Sensors (GBS) and other data management support, developed and implemented VDC; BMD SSC – provided Optic Cobra, Theatre Missile Defense System Exerciser (TMDSE), System Integrated Test (SIT) –98, SIT-99 Wargame 2000, Extended Air Defense Test Bed (EADTB), NMD Data Management support, and developed and implemented the VDC network. 		
Total	46226	
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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3352
<p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 13360 Provide high performance computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground –Based Radar (GBR), ISTC, and NMD Joint Program Office Support. Major areas of support include maintenance, modification, and enhancements of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; concept studies; and alternative trade-off analysis. • 2622 Provide funding for Army salaries in support of the ARC/SC. • 5235 Provide BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area also includes funding for Service M&S activities. Top priorities include: the BMDO M & S Acquisition Strategy and Investment Plan; Wargame 2000; BMD SSC; Modeling and Simulation Working Group (MSWG) management; execution of MSWG action plans; and model assessments/evaluations. • 1728 Continue to support BMDO's Mission Oriented ITR. Priorities include: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations and computationally intensive analyses; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs; and support the drafting and execution of BMDO Strategic Information Management Plan and FYIRMP. • 9378 Provide JNTF Project funding to support continued development of Wargame 2000. The Wargame 2000 program will continue to design and develop a "world-class" simulation tool for use in support of CINC wargames and exercises testing operational concepts involving Theater Air and National Missile Defense. Funding will involve development to support a Wargame 2000 Theater Air and Missile Defense (TAMD) demonstration exercise and a NMD Follow-on capability (FOC). Continue to incorporate new web technology into the BMD SSC, as well as continue the population and refinement of M&S catalogs/repositories. Continue to refine and update on-line query capabilities of both unclassified and classified information. Assist and improve DoD support to the DMSO MSRR. • 7262 Design and develop a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In parallel effort, connect AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability will link the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the Moorestown, NJ, NJ AEGIS Combat System Engineering Development Site (CSEDS). The NGI/VPN technology will support high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications. <p>Total 39585</p>		
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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000																															
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations			PROJECT 3352																															
FY 2001 Planned Program: <ul style="list-style-type: none"> • 11926 Provide high performance computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground –Based Radar (GBR), ISTC, and NMD Joint Program Office Support. Major areas of support include maintenance, modification, and enhancements of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; concept studies; and alternative trade-off analysis. • 1532 Provide funding for Army salaries in support of the ARC/SC. • 3705 Provide BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area also includes funding for Service M&S activities. Top priorities include: the BMDO M&S Investment Plan; Wargame 2000; BMD SSC; MSWG management; execution of MSWG action plans; and model assessments/evaluations. • 3523 Continue to support BMDO's Mission Oriented ITR. Priorities include: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations and computationally intensive analyses; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs; and updates to and execution of the FYIRMP. • 7234 Provide JNTF Project funding to support continued development of Wargame 2000. The Wargame 2000 program will continue to design and develop a "world-class" simulation tool for use in support of CINC wargames and exercises testing operational concepts involving Theater Air and National Missile Defense. Continue to incorporate new WEB technology into the BMD SSC, as well as continue the population and refinement of M&S catalogs/repositories. Continue to refine and update on-line query capabilities of both unclassified and classified information. Assist and improve DoD support to the DMSO MSRR. <p>Total 27920</p>																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">B. Other Program Funding Summary</td> <td style="text-align: center;"><u>FY 1999</u></td> <td style="text-align: center;"><u>FY 2000</u></td> <td style="text-align: center;"><u>FY 2001</u></td> <td style="text-align: center;"><u>FY 2002</u></td> <td style="text-align: center;"><u>FY 2003</u></td> <td style="text-align: center;"><u>FY 2004</u></td> <td style="text-align: center;"><u>FY 2005</u></td> <td style="text-align: center;">To <u>Compl</u></td> <td style="text-align: center;">Total <u>Cost</u></td> </tr> <tr> <td>2400, Modeling and Simulation, PE 0603871C</td> <td style="text-align: center;">700</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">CONT.</td> <td style="text-align: center;">CONT.</td> </tr> <tr> <td>3352, Modeling and Simulation, PE 0603872C</td> <td style="text-align: center;">16539</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">CONT.</td> <td style="text-align: center;">CONT.</td> </tr> </table>									B. Other Program Funding Summary	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Compl</u>	Total <u>Cost</u>	2400, Modeling and Simulation, PE 0603871C	700	0	0	0	0	0	0	CONT.	CONT.	3352, Modeling and Simulation, PE 0603872C	16539	0	0	0	0	0	0	CONT.	CONT.
B. Other Program Funding Summary	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Compl</u>	Total <u>Cost</u>																													
2400, Modeling and Simulation, PE 0603871C	700	0	0	0	0	0	0	CONT.	CONT.																													
3352, Modeling and Simulation, PE 0603872C	16539	0	0	0	0	0	0	CONT.	CONT.																													
C. Acquisition Strategy: The work in this project is sourced through full and open competition. Primary M&S support is performed at the JNTF, ARC/SC, MDDC, AMSC, BCE, BMD SSC and other test bed facilities. The ARC/SC contractor operates under a Cost Plus Fixed Fee (CPFF) contract first awarded in June of 1989.																																						
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D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
BMDSSC Version Release (Unclassified)	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q
Wargame 2000 Integration with BMC3	1Q					
M-O FYIRMP	4Q	4Q	4Q			
BMD SSC Version Release (Classified)	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q
99A C2SIM with Wargame 2000	1Q					
Wargame 2000 TAMd IOC	3Q					
Wargame 2000 TAMd FOC		4Q				
M & S Acquisition Strategy	1Q					
M & S Investment Plan	2Q	2Q	2Q	2Q	2Q	2Q

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BMDO RDT&E COST ANALYSIS (R-3)

DATE

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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ARC Infrastructure	SS/CPFF	Colsa Corporation (HSV)	9037	9831		8943		TBD	27811	
b. Simulation Center Infrastructure	C/CPFF	Madison Research (HSV)	4520	3528		2983		TBD	11031	
c. WG2K Software Dvlpmnt, Rqmt Analysis, System Engineering and design test	C/CPAF	TRW (JNTF)	12674	9378		7234		TBD	29286	
d. Services M&S			0	462		0		TBD	462	
e. BMDO Data Centers			11918						11918	
f. Mission Oriented ITR			780	1728		3523			6031	
g. Bandwidth Infrastructure				7261					7261	
Subtotal Product Development:			38929	32188		22683			93800	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:										

Remark:

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BMDO RDT&E COST ANALYSIS (R-3)								DATE February 2000		
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III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										
Remark:										
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army Salaries		Huntsville	2860	2624		1532		TBD	7016	
b. BMDO M&S Management			3270	4773		3705		TBD	11748	
c.										
d.										
e.										
f.										
Subtotal Management Services:			6130	7397		5237			18764	
Remark:										
Project Total Cost:			45059	39585		27920			112564	
Remark:										

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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3353	
<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3353 JNTF	57211	55632	54741	52672	53942	58619	59961	Continuing	Continuing
<p>* The funding in this project for FY99-03 was transferred from PEs 0603871C and 0603872C. See those R2s for FY96-98 funding.</p> <p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This project provides core funding for the Joint National Test Facility (JNTF) for the Ballistic Missile Defense Organization's (BMDO) joint missile defense modeling, simulation, and test center of excellence whose focus is the joint inter-service, interoperability, and integration aspects of missile defense system acquisition. It is staffed by all of the Services. The JNTF is the BMDO's level playing field for the resolution of missile defense issues which cut across Service interfaces. The JNTF conducts human-in-the-loop missile defense wargaming for concept of operations (CONOPS) exploration and development. The JNTF also provides simulation, communication connectivity and other assets in support of BMDO- and CINC-sponsored theater missile defense exercises. The JNTF is the site at which increments of the National Missile Defense (NMD) Battle Management/Command, Control, and Communications (BMC3) capability are hosted. Test planning, implementation and analysis for both NMD and Theater Missile Defense (TMD) are conducted at the JNTF. The JNTF performs interoperability tests among the major TMD components. Ballistic Missile Defense (BMD) system-level analysis of missile defense issues are conducted here. The JNTF also performs studies and analysis in support of joint missile defense and provides inter-service computational capabilities and wide area network communication networks with Service facilities. The JNTF provides the missile defense community a data center to support their work and manages the BMDO Data Centers program.</p> <p>FY 1999 Accomplishments:</p>									
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<ul style="list-style-type: none"> 57211 The JNTF conducted a TMD interoperability test and subsequent analysis in the second quarter. This test gave clear indications of interoperability problems that needed to be addressed by the various systems involved. Preparations were made and dry runs conducted for an expanded test that was to occur in the first quarter of FY00. A BMDO data center was established at the JNTF. The JNTF developed and delivered the first version of a new wargaming model, <i>Wargame 2000</i>, that will provide increased capability to NMD Command & Control (C2) simulations and TMD wargames. It incorporated an object oriented parallel discrete event simulation architecture which will allow distributive processing giving more throughput with smaller less expensive computers. It supplies near realtime access to the wargame database which provides more game realism. This model will be the only tool to provide support to the NMD Deployment Readiness Review in the summer of CY00. The JNTF supported 25 CINC exercises with missile defense inputs through the Missile Defense and Space Tool. They also conducted Y2K testing for BMDO HQ and JNTF computer systems. Conducted a JTAMD table-top demonstration for the warfighter community. Began planning for a joint US/Russian Federation wargame to take place in FY00. Conducted Passive Defense Early Warning Analysis for the Joint Theater and Air Missile Defense (JTAMD) Organization Technical Director in support of their Joint Mission Area Assessment. Employed the JNTF's capability to compare and contrast various approaches to fusing data for NMD and TAMD functions which contributed to the Joint Composite Tracking Network algorithm benchmarking effort. Began conducting a verification and validation of the TMDSE TADIL J Communication Emulation Segment. Conducted a successful V&V of the Upgraded Early Warning Radar representation for NMD tests IGT-3, IGT-4 and IGT-5. The JNTF became one of only 15 high-performance computing distributing centers in the U.S. This provides high-end computational resources for the entire DoD community. This capability allowed the acceleration of the <i>Wargame 2000</i> development. Obsolete servers and workstations support the analysis mission area were upgraded. Began implementation of an off-line network testing capability to support technology insertion, proof of concept validation, training, and disaster recovery. 		
Total	57211	
FY 2000 Planned Program:		
<ul style="list-style-type: none"> 24314 Provide a core capability of technical expertise that makes the JNTF the center of excellence in missile defense acquisition support and allows for fast response on new tasking. Conduct two major TMD Hardware-in-the-Loop interoperability tests with analysis reports, and accomplish all preparations for a third test that will be conducted in 1QFY01. Continue to update the Theater Missile Defense System Exerciser (TMDSE) that provides a test platform for BMDO-sponsored Hardware in the Loop Tests (HWILTs). Provide analysis expertise to address BMD issues across the entire development and operational spectrum. Provide command and control simulations for TMD and NMD for joint CONOPS development, and missile defense system simulations to CINC exercises. Utilize <i>Wargame 2000</i> to accomplish a major TMD simulation to test CONOPS. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide BMDO Data Centers to store, archive, manage, develop and distribute data products, and provide remote access to all relevant BMD science and technical data/information from experiments, tests, demonstrations, wargames, simulations, model executions, joint effectiveness analyses, and evaluations. 2023 Modernize and upgrade information resource technology base to maintain the JNTF as a state-of-the-art facility to support joint modeling and simulation, and distributed testing. Begin Wide Area Network (WAN) upgrade to support distributed testing without expensive dedicated communication lines. Provide software process improvement for modeling and simulation, develop processes for testing and improving models and algorithms. Implement facility modernization to support the technology base. 		
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4 - Demonstration and Validation	0603874C BMD Technical Operations	3353
<ul style="list-style-type: none"> 29295 Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This area also supports \$23M of mission work from other BMDO PMAs.) 		
Total	55632	
FY 2001 Planned Program:		
<ul style="list-style-type: none"> 23273 Provide a core capability of technical expertise that makes the JNTF the center of excellence in missile defense acquisition support and allows for fast response on new tasking. Conduct two major TMD Hardware-in-the-Loop interoperability tests with analysis reports, and accomplish all preparations for a third test that will be conducted in 1QFY02. Continue to update the Theater Missile Defense System Exerciser (TMDSE) that provides a test platform for BMDO-sponsored Hardware in the Loop Tests (HWILT). Provide analysis expertise to address BMD issues across the entire development and operational spectrum. Provide command and control simulations for TMD and NMD for joint CONOPS development, and missile defense system simulations to CINC exercises. In addition to large C2 simulations, conduct 2-3 smaller simulations to support BMC3 procedure development. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide BMDO Data Centers to store, archive, manage, develop and distribute data products, and provide remote access to all relevant BMD science and technical data/information from experiments, tests, demonstrations, wargames, simulations, model executions, joint effectiveness analyses, and evaluations. 1576 Modernize and upgrade information resource technology base to maintain the JNTF as a state-of-the-art facility to support joint modeling and simulation, and distributed testing. Complete WAN upgrade. Provide software process improvement for modeling and simulation, develop processes for testing and improving models and algorithms. Implement facility modernization to support the technology base. 29892 Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This operations support also supports mission work from other BMDO PMAs.) 		
Total	54741	
Project 3353		
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Exhibit R-2A (PE 0603874C)		

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE
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BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603874C BMD Technical Operations

PROJECT

3353

B. Other Program Funding Summary*	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Compl</u>	Total <u>Cost</u>
3352 Modeling & Simulation, PE 0603174C	15742	8274	8061	6666	4672	4765	4857		
2259 Israeli Cooperative Projs, 0603875C	405	178							
2404 BMC3, 0603871C	3820	4879							
2407 Systems Engineering, 0603871C	2089	4700							
3153 Systems Arch & Engineering, 0603874C	449								
3155 Sys Eng & Integration, 0603873C	95	47							
3261 TMD BM/C3I, 0603873C	2009	732	823	2530	867	1193	692		
3270 Threat And CM Program, 0603876C	3443	1974	2544	2527	2518	2557	2698		
3359 Test, Eval & Assessment, 0603873C	1307	2493	2683	2681	2679	27775	2871		
3360 Test Resources, 0603874C	276								
*Note: These dollars do not represent total project funding, but rather only related portion of budget funding									

C. Acquisition Strategy: The tasks in this project are met through full and open competition. The JNTF support contracts were awarded to Lockheed Martin, (Operations & Maintenance) and TRW (Research & Development), both contracts are Cost Plus Award Fee. In February 1999, the OMC and RDC was combined and referred to as the CRDC (Combined Research & Development Contract) with TRW being the prime contractor and Lockheed-Martin a subcontractor to TRW; cost reporting for FY99 was consolidated as CRDC. This contract will be re-competed in FY01 through full and open competition. Formal source selection procedures are envisioned with an estimated award date of 15 October 2001. Contracted Advisory & Assistance Services are provided by Vanguard Research as Cost Plus Award Fee. This contract will be re-competed as a technical and administrative assistance contract for the JNTF Government staff in FY00. Formal source selection procedures are envisioned with an estimated award date of 15 October 2000.

D. Schedule Profile	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
TAMD/CINC Exercises	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
TAMD Wargame		4Q	2Q	3Q	3Q	3Q	3Q
BMD Workshop	3Q	2Q	2Q	2Q	2Q	2Q	2Q
Workstation Upgrade	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
C2 Simulation (NMD)	1Q	1&3Q	1&3Q	1&3Q	1&3Q	1&3Q	1&3Q
Interoperability Tests	2Q	1&2Q	1&2Q	1&2Q	1&2Q	1&2Q	1&2Q

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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost FY99-01	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
1. TRW	C/CPAF	JNTF	47919	41519		40762		Cont.	130200	
2. Vanguard Research	C/CPAF	JNTF	3855	3674		3278	1Q01	Cont.	10807	
3. JNTF	Government	JNTF	3971	4007	N/A	3924	N/A	Cont.	11902	
4. USN NRL	Government	JNTF	866	809	N/A	800	N/A	Cont.	2475	
5. LLNL	FFRDC	JNTF	600	300		300			1200	
6. SMDC	Government	SMDC, Huntsville Al		2365		2511	N/A	Cont.	4876	

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7. AEDC & AFRL	Government	AEDC, Arnold AFB TN; AFRL Hanscom AFB MA		1933		2106	N/A	Cont.	4039	
8. MITRE	FFRDC	JNTF		1025	N/A	1060	N/A	Cont.	2085	
Subtotal Support Costs:			57211	55632		54741			167584	
<p>Remark:</p> <p>The JNTF provides missile defense-related analysis, system level engineering, integration, and test and evaluation; supports the development of joint and combined missile defense doctrine, requirements, and CONOPS; and supports warfighting CINCs by conducting joint and combined simulations and wargames and participating in exercises. It accomplishes this mission by hosting BMDO projects, and non-BMDO customers who have synergy with missile defense, with space occupancy (facility O&M, security, utilities, transportation and handling, etc.), computers (O&M, networking, supplies and materials, customer service, licensing, installation, etc.), communications, modernization of computer equipment and software, facility modifications and enhancements, and product engineering support.</p> <p>The JNTF focus is on interoperability testing. This involves conducting C2 simulations to develop and test CONOPS for missile defense, and conducting tests with all TMD missile defense systems connected to test their ability to work together in a theater defensive posture.</p> <p>On 1 Feb 99 JNTF consolidated the Lockheed Martin O&M contract and the TRW R&D contract into a TRW Consolidated R&D Contract.</p>										
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										
Remark:										
Project Total Cost:			57211	55632		54741			167584	
Remark:										
<div style="display: flex; justify-content: space-between;"> Project 3353 Page 35 of 52 Pages Exhibit R-3 (PE 0603874C) </div>										

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3354	
<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3354 Targets*	1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing

* Funding for this project for FY01-05 contributed by PE 0603872C.

A. Mission Description and Budget Item Justification

This project maintains the Strategic Target System (STARS) motors, components and launch equipment and mission planning support for possible future use as a Theater Missile Defense (TMD) long range target or National Missile Defense (NMD) target.

Starting in FY01, this project will include core funding for targets and target related services needed to support the testing and evaluation of all TMD programs to include: Theater High –Altitude Area Defense (THAAD); PATRIOT Advanced Capability – 3 (PAC-3); Navy Area Defense (NAD); Navy Theater Wide (NTW) and the US Air Force Airborne Laser (ABL) programs. This project is a segment of the BMDO Consolidated Targets Program (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor and sensor development acquisition programs. Each target is tailored and configured to meet unique mission requirements for each test. This project will fund the development and demonstration of U.S.-built target systems and Foreign Military Acquisition targets to support TMD test and evaluation.

The THAAD program intends to use the Hera target system with planned launches at White Sands Missile Range (WSMR) including FT. Wingate Launch complex in New Mexico and from Wake Island into the Kwajalein Missile Range (KMR) impact area. The PAC-3 program will use Storm and Hera targets launched from WSMR and Wake Island. The Navy Area and Theater Defense programs will use Hera and other ground targets at WSMR and the Pacific Missile Range Facility (PMRF) (Barking Sands, Kauai, HI). This project is developing a short range (200-600 Km) air launch ballistic target and a long range (1000-3000 Km) air-launch target to satisfy the collective target requirements of PAC-3, THAAD, both Navy programs, and TMD Family of Systems (FoS) tests for multiple simultaneous engagements, multi-axis scenarios, and short range and long-range threat target presentations. THAAD and PAC-3 will use air-launched targets at KMR and the Navy will use air-launched targets at PMRF. The project is also developing threat representative reentry vehicles to simulate a set of baseline threats.

FY 1999 Accomplishments:

- 1936 Funds supported STARS target program.

Total 1936

FY 2000 Planned Program:

- 2300 Funds will be used to continue support of STARS target program.

Total 2300

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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3354																																																																																																				
FY 2001 Planned Program: <ul style="list-style-type: none"> • 95 Provide maintenance for acquired Foreign Material Acquisition (FMA) targets. • 2628 Provide government project personnel support. • 16754 Provide booster hardware refurbishment, aging surveillance and static firings of booster assets. • 8809 Continue development of Long Range Air Launched Target (LRALT) and Low Fidelity Test Target (LFTT). • 11741 Provide technical support for target program operations. • 6584 Continue Range and launch support. • 2524 Provide verification and validation of TBD targets and sensor characterization of target payloads. <p>Total 49135</p>																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">B. Other Program Funding Summary</th> <th></th> <th><u>FY 1999</u></th> <th><u>FY 2000</u></th> <th><u>FY 2001</u></th> <th><u>FY 2002</u></th> <th><u>FY 2003</u></th> <th><u>FY 2004</u></th> <th><u>FY 2005</u></th> <th><u>To Compl</u></th> <th><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>2257 PATRIOT, PE 0604865C</td> <td></td> <td>237345</td> <td>179139</td> <td>81016</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>2260 THAAD, PE 0604861C</td> <td></td> <td>0</td> <td>79462</td> <td>549945</td> <td>685168</td> <td>789736</td> <td>755134</td> <td>591049</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>2260 THAAD, PE 0603861C</td> <td></td> <td>429266</td> <td>523525</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>1266 NAVY THEATER WIDE, PE 0603868C</td> <td></td> <td>364284</td> <td>375764</td> <td>382671</td> <td>287274</td> <td>214301</td> <td>246657</td> <td>429674</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>2263 NAVY AREA, PE 0604867C</td> <td></td> <td>241782</td> <td>307274</td> <td>274234</td> <td>228596</td> <td>85866</td> <td>33293</td> <td>29369</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>3354 TARGETS, PE 0603872C</td> <td></td> <td>17615</td> <td>48056</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>3360 TEST RESOURCES, PE 0603872C</td> <td></td> <td>45846</td> <td>13734</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>CONT</td> <td>CONT</td> </tr> <tr> <td>3360 TEST RESOURCES, PE 0603874C</td> <td></td> <td>41005</td> <td>66237</td> <td>69555</td> <td>64211</td> <td>54314</td> <td>54375</td> <td>54975</td> <td>CONT</td> <td>CONT</td> </tr> </tbody> </table>										B. Other Program Funding Summary		<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>	2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	CONT	CONT	2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	CONT	CONT	2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	CONT	CONT	1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	CONT	CONT	2263 NAVY AREA, PE 0604867C		241782	307274	274234	228596	85866	33293	29369	CONT	CONT	3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	CONT	CONT	3360 TEST RESOURCES, PE 0603872C		45846	13734	0	0	0	0	0	CONT	CONT	3360 TEST RESOURCES, PE 0603874C		41005	66237	69555	64211	54314	54375	54975	CONT	CONT
B. Other Program Funding Summary		<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>																																																																																																		
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	
		PROJECT 3354

C. Acquisition Strategy:

The Hera and Storm target systems are being developed by the executing agent: U.S. Army Space and Missile Defense Command (USASMDC), Theater Targets Products Office (SMDC-TJ-TT) in Huntsville, AL. The Hera target system, developed by Coleman Aerospace Corporation (CAC) Orlando, FL is being procured with a contract for a quantity of 25 targets. Orbital Sciences Corporation (OSC) has delivered four Storm Maneuvering Tactical Target Vehicles (MTTV). Additional targets include the Lance target system and Foreign Material Acquisition. The development and demonstration of the air launch ballistic target system is being managed by USASMDC/TT&E office with the Air Force Space and Missile Command as the contracting agency. The Consolidated Theater Target Systems (CTTS) contract was awarded 27 February 1998 to CAC, OSC and Lockheed Martin Missile Systems (LMMS) to produce future theater targets. This contract provides increased flexibility to meet MDAP schedules and requirements. USASMDC will maintain STARS at a sustainment level to keep the knowledge base and components necessary to launch a STARS target in the future.

D. Schedule Profile	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Navy Area			1-4Q	1&3Q	1Q		
Navy Theater			2-4Q	2Q	1-4Q		
THAAD							3-4Q
PAC-3			2Q				
ABL				4Q	3-4Q	2Q	
Others (Technology Programs)			2Q				

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BMDO RDT&E COST ANALYSIS (R-3)

DATE

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BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603874C BMD Technical Operations

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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
		USABMDC				46507	N/A		46507	
Subtotal Product Development:						46507			46507	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Maintenance of System	Allot	USASMDC, Huntsville, AL	1936	2300	10/01/99	2628	10/01/99	TBD	6864	N/A
Subtotal Management Services:			1936	2300		2628	10/01/99		6864	

Remark:

Project Total Cost:			1936	2300		49135			53371	
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Remark:

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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3360	
COST (In Thousands)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3360 Test Resources*	41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing
<p>* Funding for this project for FY01-05 contributed by PE 0603872C (Joint TMD).</p> <p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This project provides for BMDO planning, oversight and coordination of integrated test and evaluation facilities. The project includes inter-element as well as inter-service test and evaluation efforts, and provides for common ground test facilities, ranges and instrumentation. Project 3360 funds those test resources mutually supporting BMDO's National Missile Defense (NMD), Theater Missile Defense (TMD) and Technology programs. Individual BMDO programs pay only the direct costs associated with their specific testing efforts at these mission critical facilities.</p> <p>The Technical Operations ground test facilities include:</p> <ul style="list-style-type: none"> Kinetic Kill Vehicle Hardware in the Loop Simulator (KHILS) at Eglin AFB in Fort Walton Beach, FL AEDC Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at White Oak, MD Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD. Hypervelocity Ballistic Range G Light Gas Gun Von Karman Facilities (VKF) at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN 7V and 10V Space Chambers at AEDC, Tullahoma, TN Portable Optical Sensor Testbed (POST) at Anaheim, CA National Hover Test Facility (NHTF) at Edwards AFB, CA (Deleted "located" from this line) (Last Line (APRF) Deleted) <p>The Technical Operations test range facilities include national ranges such as:</p> <ul style="list-style-type: none"> White Sands Missile Range (WSMR) in Las Cruces, NM including Ft. Wingate Launch Complex near Gallup, NM Kwajalein Missile Range (KMR) in the central Pacific Ocean Pacific Missile Range Facility (PMRF) and Kauai Test Facility (KTF) at Kauai, HI <p>The range instrumentation special test equipment, data collection assets, and range instrumentation include:</p> <ul style="list-style-type: none"> Airborne Surveillance Testbed (AST) IR data collection sensor and platform (previously managed within project 1155). Mobile Range Safety System and Kwajalein Range Safety Control Center Upgrades NP-3 Aircraft upgrade for remote area safety support. Sea-Lite Beam Director (SLBD), based at White Sands Missile Range, Las Cruces, NM Miscellaneous improvements to BMDO infrastructure and support systems 									
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	
		PROJECT 3360
<p>These ground test, range and instrumentation assets provide valuable risk reduction and test implementation capability in support of TMD and NMD test and evaluation. The ground test facilities provide a cost-effective method of testing and evaluating applicable component, sub-system and system level technologies. The common range facilities provide a cost-effective method of flight testing missile and target components applicable to the BMD program and TMD Family of Systems (FoS), BMC³ and interoperability testing. The range instrumentation provides a cost-effective capability to collect missile characteristics, phenomenology data, and target/interceptor diagnostics on flight tests. It also provides for the living quarters for personnel supporting test programs at USAKA. These facilities and capabilities support systems design, verification and validation of target realism, and the evaluation of test results.</p> <p>Starting in FY00, this program element and project also provides environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the Ballistic Missile Defense Organization (BMDO) Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. This project plans, programs, budgets, and oversees facility acquisition through the Military Construction (MILCON) and RDT&E construction programs. This project provides guidance and supports BMDO TMD, NMD, and Advanced Technology Environmental Safety and Health (ESH) Programs, including the Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts. (For FY99, these environmental, siting and facility support activities are funded in this project under PE 0603872C, Joint TMD - DEM/VAL. For FY98 and prior, these activities were managed through project 3157 within the Joint TMD PE.)</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 7090 Provided ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 to support NMD, TMD and AIT; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing, and primary IR standards, black body and optical materials, calibrations at the NIST to support other BMDO facilities. Supported THAAD flight test anomaly investigation and objective window testing at Tunnel 9. • 11106 Provided for operation and maintenance at Meck Island, core support of the Kwajelein Missile Range Safety System (KMRSS), improvement and modernization of Range Control Safety System (RCSS), technical support at Wake Island, and collection & analysis of data by MIT/LL, as well as PMRF general support and test planning. • 5152 Provided for upgrades to NP-3 aircraft, maintenance of launch facilities at White Sands Missile Range (WSMR), as well as other general range support. • 15829 Provided AST core-operating costs to collect optical data of BMDO development flights, target development flights and flight test intercepts. • 1828 Provided technical support for Resource activities by the Executing Agent and at BMDO. Total 41005 <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 13462 Provide ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; primary IR standards, black body and optical materials, calibrations at the NIST; Integrated kill vehicle testing at NHTF; capability for sled track maintenance and upkeep at HHSTT; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing; and IR testing at the POST facility. 		
<div style="display: flex; justify-content: space-between;"> Project 3360 Page 41 of 52 Pages Exhibit R-2A (PE 0603874C) </div>		

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		February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603874C BMD Technical Operations	3360
<ul style="list-style-type: none"> • 1997 Provide test range planning and range instrumentation support, maintenance and upgrades. Includes all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Includes all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges. • 19195 Support continuing Navy Area and Theater-Wide Programs TBMD risk reduction at-sea testing and infrastructure improvements at PMRF. Provides support to SLBD, an infrared optical data collection, data recording/reduction, and data analysis and reporting system. Provides maintenance of the physical plant, the technical systems and the compliance posture of the Kauai Test Facility. Supports risk reduction activities for Navy Area Defense (NAD) and Navy Theater Wide (NTW) testing, by implementing additional upgrades and improvements to the radar instrumentation, range data display system, telemetry instrumentation, a scenario planning tool, and advanced electro-optical sensor technology at PMRF. • 1920 Provide for White Sands Missile Range (WSMR) general support to BMDO and provides for the maintenance and care of launch facilities which support BMD testing. Contracts with land owners for the use of their land. Provides White Sands technical support to BMDO to conduct studies as needed, to respond to tasking as requested, and to provide manpower support to BMDO in the Washington, D.C. area. • 9608 Provide range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provides caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety (USS Worthy/Kwajalein Mobile Range Safety System). Provides the KMR Wake Island maintenance, development and integration of core technical support capabilities. Continues a multiyear effort to upgrade the Range Safety Control Center for Multiple Simultaneous Engagements and to replace the underground communications cable on the islands of Kwajalein, Roi Namur and Meck. • 16230 Provide O&M core funding to keep the AST Program team intact and the system operational in order to support customer-funded TMD and NMD live fire tests at various ballistic missile test ranges, worldwide. Perform collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs. • 1040 Integrate ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are: 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials management, and 5) pollution prevention. Work continues on environmental analyses for National Missile Defense (NMD), Medium Extended Air Defense System (MEADS), and Advanced Interceptor Technology (AIT). Work also continues on new BMDO requirements as well as on Space Based Laser (SBL), Navy Area, Navy Theater Wide, THAAD and PAC-3 systems. • 1494 Ensure the FY99-01 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensures compliance with all applicable laws and regulations. The design emphasis will be on completing design for the National Missile Defense (NMD) facility requirements in preparation for the Deployment Readiness Review and design for TMD systems. Provides for TMD and NMD test and evaluation facilities improvements to support increasingly complex test scenarios. • 1291 Provide technical support for Resource activities by the Executing Agent and at BMDO. 		
Total	66237	
FY 2001 Planned Program:		
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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
<ul style="list-style-type: none"> • 18830 Provide ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; and primary IR standards, black body and optical materials, calibrations at the NIST. Provide ground test facility infrastructure and upgrades for BMDO testing at KHILS to support endgame HWIL testing at integrated IR sensors systems including THAAD, AIT, NMD, and Navy Theater Wide TBMD. • 3150 Provide test range planning and range instrumentation support, maintenance and upgrades; includes all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Includes all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges. • 4590 Support continuing Navy Area and Theater-Wide Programs TBMD risk reduction at-sea testing. Provides support to SLBD, an infrared optical data collection, data recording/reduction, and data analysis and reporting system. Provides maintenance of the physical plant, the technical systems and the compliance posture of the Kauai Test Facility. • 1976 Provides for White Sands Missile Range (WSMR) general support to BMDO and provides for the maintenance and care of launch facilities which support BMD testing. Contracts with land owners for the use of their land. Provides White Sands technical support to BMDO to conduct studies as needed, to respond to tasking as requested, and to provide manpower support to BMDO in the Washington, D.C. area. • 6200 Provide for the caretaker activities to maintain Wake Island facilities for BMD target launch operations. Provides lease of Defense Information Systems Agency provided relay satellite bandwidth and the receiver earth station at Hickam AFB, Hawaii. Provides for the payment of shipments to and from Wake Island via air and sea. Provides fuel purchases. Provides environmental compliance for Wake Island. • 9830 Provide range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provides caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety. Provides the KMR Wake Island maintenance, development and integration of core technical support capabilities. Continues a multiyear effort to replace the underground communications cable on the islands of Kwajalein, Roi Namur and Meck. • 16269 Provide O&M core funding to keep the AST Program team intact and the system operational in order to support customer-funded TMD and NMD live fire tests at various ballistic missile test ranges, worldwide. Perform collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs. • 5000 Provide core funding to perform all activities required to maintain a mission-ready optical data collection test asset (HALO/IRIS) to support TMD/NMD data collection missions required/requested by BMDO, MDAPs, and other Programs/Projects. • 1024 Integrate ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials, and 5) pollution prevention. Work continues on new BMDO requirements as well as on NMD, Space Based Laser (SBL), Navy Area, Navy Theater Wide, MEADS, THAAD and PAC-3 systems to meet their requirements. • 1515 Ensure the FY01-03 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensures compliance with all applicable laws and regulations. Support NMD design and construction requirements. Support the design and construction of facilities to test and field ballistic missile defense systems such as Space Based Laser (SBL), THAAD, PAC-3, Navy Area, and Navy Theater Wide. 		
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BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3360		
<ul style="list-style-type: none"> • 1171 Provide technical support for Resource activities by the Executing Agent and at BMDO. 										
Total 69555										
B. <u>Other Program Funding Summary</u>										
		<u>FY</u> 1999	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	Cont.	Cont.
2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	Cont.	Cont.
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	Cont.	Cont.
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	Cont.	Cont.
2263 NAVY AREA, 0604867C		241782	307274	274234	228596	85866	33293	29369	Cont.	Cont.
3354 TARGETS, PE 0603874C		1936	2300	49135	36211	38081	40260	40882	Cont.	Cont.
3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	TBD	TBD
3360 TEST RESOURCES, PE 0603871C		1680	494	474	470	466	476	486	Cont.	Cont.
3360 TEST RESOURCES, PE 0603872C		45846	13734	0	0	0	0	0	TBD	TBD
3360 MILCON Planning & Design, PE 0603872C		331	0	0	0	0	0	0	TBD	TBD
3360 Minor MILCON, PE 0603874C		0	1248	1694	2609	2709	2755	2778	Cont.	Cont.
3360 MILCON Planning & Design, PE 0603874C		0	124	229	240	241	850	850	Cont.	Cont.
2400 NMD MILCON Planning & Design, PE 0603871C		9669	15000	14500	0	0	0	0	TBD	TBD
2400 NMD Minor MILCON, PE 0603871C		0	0	2000	2000	2000	2000	2000	Cont.	Cont.
2400 NMD MILCON, PE 0603871C		0	0	85095	189940	124450	36350	15300	Cont.	Cont.
2400 NMD, PE 0603871C		1638798	934859	1798626	998667	875916	680107	649009	Cont.	Cont.
C. <u>Acquisition Strategy:</u>										
BMDO tasks the Services through Program Management Agreements to perform the required tasks in support of the BMD program and performs quarterly reviews to verify and validate completed tasks.										
In providing range and test facilities support to the MDAP Program managers, as well as, technical assistance concerning facilities construction, siting, and environmental activities, BMDO implements a Reliance Process which:										
<ul style="list-style-type: none"> • Maintains perspective of national technical test capabilities relative to all BMD developmental programs, • Responds to MDAP program requirements, • Makes maximum use of existing test resources where possible, • Requires full coordination prior to development of new resources, 										
<div style="display: flex; justify-content: space-between;"> Project 3360 Page 44 of 52 Pages Exhibit R-2A (PE 0603874C) </div>										

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<ul style="list-style-type: none"> Consolidates management of existing resources where possible and practical. <p>This process is executed through a variety of acquisition methods. Executing Agent Project Managers for the elements and tasks under this project include the three military services and the BMDO. Service Project Manager organizations specifically include the:</p> <ul style="list-style-type: none"> U.S. Army Space and Missile Defense Command (USASMDC) U.S. Air Force Materiel Command U.S. Navy Office of Naval Research Navy Program Executive Officer (Theater Air Defense) U.S. Air Force Research Laboratory U.S. Army Corps of Engineers, and the U.S. Army Program Executive Officer-Missile Defense. 																																																																																																																																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">D. Schedule Profile</th> <th><u>FY 1999</u></th> <th><u>FY 2000</u></th> <th><u>FY 2001</u></th> <th><u>FY 2002</u></th> <th><u>FY 2003</u></th> <th><u>FY 2004</u></th> <th><u>FY 2005</u></th> </tr> </thead> <tbody> <tr><td>KHILS – DITP (Quantum Well, Integration Tests)</td><td></td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td><td></td></tr> <tr><td>KHILS – DTRA (Nuclear Requirements)</td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td></tr> <tr><td>KHILS – BPI (System Studies)</td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td></td></tr> <tr><td>KHILS – Target VV&A</td><td></td><td>1-2Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7V/10V – GBI: BNA</td><td></td><td>1-4Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7V/10V – GBI: Raytheon</td><td></td><td>1-4Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Tunnel 9 – THAAD Support</td><td></td><td></td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td></tr> <tr><td>Tunnel 9 – Arrow Support</td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td></tr> <tr><td>Tunnel 9 – NMD</td><td></td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td><td></td></tr> <tr><td>Tunnel 9 – Phenomenolgy Support</td><td></td><td>1-4Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Tunnel 9 – Navy Lower Tier Support</td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td></tr> <tr><td>Range G – NMD</td><td></td><td>2-4Q</td><td></td><td>1-4Q</td><td></td><td></td><td></td></tr> <tr><td>Range G – Navy Theater TBMD</td><td></td><td>1-4Q</td><td>1-4Q</td><td></td><td></td><td></td><td></td></tr> <tr><td>Range G – Phenomenology Impact</td><td></td><td>1-2Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Range G – THAAD</td><td></td><td>2-4Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>RCSS Operational Capability</td><td></td><td>3Q</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>NIST – 7V/10V, EKV SM-3, SBIRS (Blackbody Calibration)</td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td></tr> <tr><td>NIST – SM-2, THAAD, EKV, NraD (Emissivity)</td><td></td><td></td><td></td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td><td>1-4Q</td></tr> <tr><td>KMR TCMP Launch</td><td></td><td></td><td>2Q</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>								D. Schedule Profile	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	KHILS – DITP (Quantum Well, Integration Tests)		1-4Q	1-4Q					KHILS – DTRA (Nuclear Requirements)		1-4Q	1-4Q	1-4Q				KHILS – BPI (System Studies)		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q		KHILS – Target VV&A		1-2Q						7V/10V – GBI: BNA		1-4Q						7V/10V – GBI: Raytheon		1-4Q						Tunnel 9 – THAAD Support			1-4Q	1-4Q				Tunnel 9 – Arrow Support		1-4Q	1-4Q	1-4Q				Tunnel 9 – NMD		1-4Q	1-4Q					Tunnel 9 – Phenomenolgy Support		1-4Q						Tunnel 9 – Navy Lower Tier Support		1-4Q	1-4Q	1-4Q				Range G – NMD		2-4Q		1-4Q				Range G – Navy Theater TBMD		1-4Q	1-4Q					Range G – Phenomenology Impact		1-2Q						Range G – THAAD		2-4Q						RCSS Operational Capability		3Q						NIST – 7V/10V, EKV SM-3, SBIRS (Blackbody Calibration)		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	NIST – SM-2, THAAD, EKV, NraD (Emissivity)				1-4Q	1-4Q	1-4Q	1-4Q	KMR TCMP Launch			2Q				
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BUDGET ACTIVITY

4 - Demonstration and Validation

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PE NUMBER AND TITLE
0603874C BMD Technical Operations

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0603874C BMD Technical Operations

WSMR Navy SM2-Blk IV Testing		4Q	1Q				
AST		1-4Q	1-4Q				
Environmental Support for BMDO Programs		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Facility Acquisition Support for BMDO Programs		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q

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BMDO RDT&E COST ANALYSIS (R-3)

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PROJECT

3360

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville	0	99	10/1/99	102	10/01/01	Cont.	201	N/A
b. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TAD, Arlington VA	0	99	10/1/99	101	10/01/01	Cont.	200	N/A
c. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA	0	15	10/1/99	15	10/01/01	Cont.	30	N/A
d. Army SMDC Fac/Envir Prog Development	Allot	Army SMDC, Huntsville, AL	0	245	10/1/99	250	10/01/01	Cont.	495	N/A
e. PMRF Upgrades	Allot	NAVY, PMRF		10000	TBD				10000	
f. Optical Sensor Upgrade	Allot	Navy, PMRF		5000	TBD				5000	
Subtotal Product Development:				15458		468			15926	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. HALO & AST Support	Allot	SMDC, Huntsville, AL		16230	10/01/99	21269	10/01/00	Cont.	37499	
b. Wake Island Support	Allot	SMDC, Wake Island		0		6200	10/01/00	Cont.	6200	
c. KTF	Allot	Navy, Kauai Test Facility		3526	10/01/99	3540	10/01/00	Cont.	7066	
d. Facility Acquisition Life-Cycle Management	MIPR	U.S. Army Corps of Engineers, Huntsville AL		50	1/2/00	106	10/1/00	Cont.	156	N/A
e. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc. – Bethesda, MD		2010	6/99	1950	6/00	Cont.	3960	N/A

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3360

f. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington DC		16	1/1/00	15	1/1/01	Cont.	31	N/A
g. Sea Light Beam Dir	MIPR	SPAWAR		874	10/1/99	830	10/01/00	Cont.	1704	N/A
h. Kwaj. Missile Range Spt	CPAF	USASMDC		9290	10/1/99	9830	10/01/00	Cont.	19120	N/A
i. White Sands Missile Range Spt	Allot	WSMR, White Sands, NM		1920	10/1/99	1976	10/01/00	Cont.	3896	N/A
Subtotal Support Costs				33916		45716			79632	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Core Infrastructure Planning Support	Allot	USASMDC	27994	2949	10/1/99	4093	10/1/00	Cont.	35036	N/A
b. Core Infrastructure Planning Support	Allot	USAF	6731	10410	10/1/99	15843	10/1/00	Cont.	32984	N/A
c. Core Infrastructure Planning Support	Allot	JNTF	294	0	10/1/99	0	10/1/00	Cont.	294	N/A
d. Core infrastructure Planning Support	Allot	USN	1161	190	10/1/99	220	10/1/00	Cont.	1571	N/A
e. Core Infrastructure Planning Support	MIPR	Various	2519	2023	TBD	2044	TBD	Cont.	6586	N/A
f. T&E Technical Support	CPFF	SRS Technologies, Arlington, VA	1189	0	N/A	0	N/A	TBD	1189	
g. T&E Technical Support	CPAF	Vanguard Research, Fairfax, VA	559	814	6/99	698	6/00	Cont.	2071	
h. Gov Project Personnel Support	Allot	USASMDC, Huntsville, AL	558	477	10/01/99	473	10/01/00	Cont.	1508	

Project 3360

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Exhibit R-3 (PE 0603874C)

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BMDO RDT&E COST ANALYSIS (R-3)										DATE	February 2000
BUDGET ACTIVITY					PE NUMBER AND TITLE						PROJECT
4 - Demonstration and Validation					0603874C BMD Technical Operations						3360
Subtotal Management Services:			41005	16863		23371			81239		
Remark:											
Project Total Cost:			41005	66237		69555			176797		
Remark:											

Project 3360

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Exhibit R-3 (PE 0603874C)

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE February 2000	
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 4000	
<i>COST (In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
4000 Operational Support	7378	10656	10832	11072	11024	11211	11180	Continuing	Continuing

A. Mission Description and Budget Item Justification:

This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements, and support service contracts.

Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, US Army PEO Missile Defense, US Navy PEO for Theater Defense, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.

Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

FY 1999 Accomplishments:

- 7378 Provided management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 7378 0

Project 4000

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE February 2000																																																																										
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<div style="display: flex; justify-content: space-between;"> Project 4000 Page 51 of 52 Pages Exhibit R-2 (PE 0603874C) </div>																																																																												

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)						DATE February 2000	
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 4000
D. <u>Schedule Profile</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>

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